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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/618,044	07/17/2000	Werner Pompetzki	9350-0169-0	7157

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EXAMINER

PRICE, ELVIS O

ART UNIT	PAPER NUMBER
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1621

DATE MAILED: 10/23/2003

22

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/618,044

Applicant(s)

POMPETZKI ET AL.

Examin r

Elvis O. Price

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. In view of the Reply Brief filed on 12/3/02, PROSECUTION IS HEREBY REOPENED. A rebuttal to the Reply Brief is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

2. The Declaration under 37 C.F.R. 1.132, filed June 4, 2002, has been considered.

3. Applicants' amendment, filed 6/20/02, has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 5-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuhara et al. {U.S. Pat. 5,081,321}, in view of Hiles et al. {U.S. Pat. 4,626,604} and in further view of the Sigma Catalog (see pg. 1681 of 1994 Biochemicals Organic Compounds for research and Diagnostic Reagents catalog).

Applicants claim a process for the hydrogenation of acetone, which comprises: conducting the liquid-phase hydrogenation of acetone having a water content of less than or equal to 1.0% by weight in at least two hydrogenation process stages, thereby preparing isopropanol product.

Fukuhara et al. teach a process for the hydrogenation of acetone, which comprises conducting the liquid-phase hydrogenation of acetone in a reactor to produce isopropanol, in which a nickel containing catalyst supported on neutral alumina may be utilized as the hydrogenation catalyst and the reaction temperature is from room temperature to 200⁰ C and reaction pressure is from 2 to 50 bar (Col. 2, lines 20-40). The conversion and the yield of the isopropanol is 99.9%, respectively (see Example 1). The difference between Appellants ' claimed invention and the Fukuhara et al. invention is that the Fukuhara et al. reference is silent about multiple hydrogenation stages, the percentage of water contained in the acetone substrate and the percentage of by-products, if any.

Hiles et al. generally teach the unsaturated organic compounds, including acetone, can be hydrogenated to the corresponding product (isopropanol from acetone) utilizing multi-stage hydrogenation reactions (Col. 5, lines 14-45 and Col. 7, lines 50-59). Hiles et al. employ the multi-stage hydrogenation process to affect a greater conversion of the unsaturated organic compound to be hydrogenated to the corresponding product (see abstract).

The Sigma Catalog discloses commercially available acetone containing less than 0.5% water (see Product Number 27,072-5 on page 1681 of 1994 catalog).

It would have been *prima facie* obvious to one of ordinary skill in the art, in view of the cited references, to prepare isopropanol by hydrogenating acetone as presently claimed, because Fukuhara et al. teach that acetone can be hydrogenated, in the liquid-phase, to produce isopropanol and Hiles et al. teach that compounds such as acetone can be hydrogenated in a multi-stage hydrogenation process.

One of ordinary skill in the art desiring to prepare highly pure isopropanol (more pure than that cited in the Fukuhara et al. reference) would have been motivated, in view of the Sigma Catalog and Hiles et al., to use the commercially available acetone taught produced by Sigma in the Fukuhara et al. process and incorporate additional hydrogenation stages, so as to optimize the total conversion of the isopropanol product, because Hiles et al. teach a multi-stage hydrogenation process, in which an unsaturated organic compound such as acetone is hydrogenated, can affect a greater conversion of the acetone to the corresponding hydrogenated product. The instantly claimed process would therefore have been obvious to one of ordinary skill in the art.

Response to Arguments

The Declaration under 37 C.F.R. 1.132, filed June 4, 2002, has been considered but does not place the case in condition for allowance.

The Declaration merely demonstrates the impact of the content of water contained in the acetone substrate upon hydrogenation of the said acetone. Applicants have shown that as the water content in the acetone substrate increases by-product formation increases upon hydrogenation of the said acetone. Such a showing is irrelevant to the art rejection that has been applied by the Examiner, in that acetone

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containing less than 0.5% water is commercially available from Sigma (which is just as and more pure than the presently claimed acetone substrate having a water content of less than or equal to 1.0%).

Applicants' arguments filed 6/20/02 have been fully considered but they are not persuasive.

Applicants argue that the essential features of the presently hydrogenation process are that the acetone reactant contains no more than 1% by weight water and that the hydrogenation process be conducted in at least two hydrogenation stages. These essential features of the present process result in the production of an isopropanol product in high yield and purity as demonstrated by the table of the declaration executed June 4, 2002.

This argument is not convincing because the Fukuhara et al. process comprises the liquid-phase hydrogenation of acetone to produce isopropanol and applicants' claims comprise a liquid-phase hydrogenation of acetone having a water content of less than or equal to 1.0% by weight in at least two hydrogenation process stages, thereby preparing isopropanol. Even though the Fukuhara et al. reference is silent about the water content in the acetone, there is no reason for one having ordinary skill in the art to believe that the Fukuhara et al. process does not utilize acetone (commercially available acetone) having a water content of less than or equal to 1.0% by weight considering the high conversion and yield (99.9% and 99.9%, respectively) of the isopropanol product. Thus, the skilled artisan would have ventured to use commercially available acetone (from Sigma), absent any teaching to the contrary, in the Fukuhara et al. process.

Applicants argue that the Fukuhara et al. reference appears to be of secondary interest because the reference discloses an entirely different process of hydrogenating acetone, which entails a fixed bed reaction system having a granular or particulate catalyst therein. In this reactor configuration, it is essential to conduct the direction of flow of reactant liquid and hydrogen gas over the catalyst in a specific direction. That is, it is critical to provide a co-current liquid/gas down-flow relative to the fixed bed catalyst and to maintain the catalyst in a trickle bed state.

This argument is unpersuasive because applicants have generally claimed a process for hydrogenating acetone, which comprises conducting the liquid-phase hydrogenation of acetone having a water content of less than or equal to 1.0% by weight in at least two hydrogenation process stages, thereby preparing isopropanol. Fukuhara et al. explicitly teach a process for the hydrogenation of acetone, which comprises conducting the liquid-phase hydrogenation of acetone in a reactor to produce isopropanol, in which a nickel containing catalyst supported on neutral alumina may be utilized as the hydrogenation catalyst and the reaction temperature is from room temperature to 200⁰ C and reaction pressure is from 2 to 50 bar (Col. 2, lines 20-40 and Example 1). Since Fukuhara et al. is silent about the water content in the acetone, there is no reason for one having ordinary skill in the art to believe that Fukuhara et al. did not use commercially available acetone containing 1% or less of water to carry out their process and thus, the skilled artisan would have ventured to use the highly pure commercially available acetone sold by Sigma to produce isopropanol via the Fukuhara et al. process.

Applicants argue that the Hiles et al. reference is directed to a different aspect of aldehyde (ketone) hydrogenation which aspect of improvement of the catalytic hydrogenation of aldehydes is to conduct the hydrogenation in at least three hydrogenation zones.

The Examiner applied the Hiles et al. reference to address the multi-stage (at least two) hydrogenation limitation that was not taught in the Fukuhara et al. hydrogenation process. Since applicants have claimed at least two hydrogenation process stages in the hydrogenation of the presently claimed acetone, then the Hiles et al. reference is considered by the Examiner to be pertinent, analogous prior art which in fact teaches that it is advantageous to implement a multi-stage hydrogenation of unsaturated organic compounds, such as acetone, to produce the corresponding hydrogenated product with reduced byproduct formation (see Col. 5, lines 14-45 and Col. 7, lines 50-59). The skilled artisan then would be motivated, in view of the Fukuhara et al. and Hiles reference, to prepare isopropanol as presently claimed by purchasing commercially available acetone and hydrogenate the acetone via a multi-stage hydrogenation process so as to effect the optimum conversion of the acetone and yield of the isopropanol product while reducing by-product formation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elvis O. Price whose telephone number is 703 605-1204. The examiner can normally be reached on 8:30 am to 5:00 pm; Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann R. Richter can be reached on 703 308-4532. The fax phone


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numbers for the organization where this application or proceeding is assigned is 703 308-4556 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-1235.

Elvis O. Price, Ph.D.

October 8, 2003


Johann R. Richter, Ph.D., Esq.
Supervisory Patent Examiner
Technology Center 1600